Claim Amendments

1. (currently amended) An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, wherein each of said input couplers within any of said z sensor groups is connected to a corresponding one of said m distribution fiber lines, wherein each of said output couplers within any of said z sensor groups is connected to a corresponding one of said n return fiber lines;

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in ~~the~~ returned optical signal power levels;

wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler;

wherein m is 6 and n is 16.

2. (canceled)

3. (original) The sensor array of Claim 1, wherein each of said distribution fibers is coupled only to sensors that are non-adjacent.

4. (currently amended) A sensor array, comprising:

distribution fiber lines;

return fiber lines; and

sensor groups, each of said sensor groups comprising:

sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, wherein each of said input couplers within any of said sensor groups is connected to a corresponding one of said distribution fiber lines, wherein each of said output couplers within any of said sensor groups is connected to a corresponding one of said return fiber lines;

wherein coupling ratios of said input couplers and said output couplers are chosen to reduce differences in ~~the~~ returned optical signal power levels, said input couplers in a first sensor group having a first input coupling ratio and said input couplers in a second sensor group having a second input coupling ratio different from said first input coupling ratio;

wherein one or more signal sources, that comprise a first signal source, are coupled with respective ones of said distribution fiber lines, that comprise a first distribution fiber line;

wherein said input couplers comprise a first input coupler and a second input coupler, wherein a first number of said input couplers are located on the first distribution fiber line between the first signal source and said first input coupler, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first input coupler is based on the first number, wherein a second number of said input couplers are located on the first distribution fiber line between the first signal source and said second input coupler, wherein the coupling ratio of said second input coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second input coupler is larger than the coupling ratio of said first input coupler;

wherein each output coupler is connected to a respective return fiber line from a sensor group having a coupling ratio that differs from the coupling ratio of the other output couplers connected to the respective return fiber line, wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler, said input coupling ratios and said output coupling ratios selected in accordance with respective locations of said input couplers on said distribution fiber lines and respective locations of said output couplers on said return fiber lines.

5. (original) The sensor array of Claim 4, wherein returned optical signals have respective powers within a 7 dB range.

6. (original) The sensor array of Claim 4, wherein the number of said distribution fiber lines is 6, and the number of said returned fiber lines is 16.

7. (original) The sensor array of Claim 4, wherein optical signals are multiplexed on said return fiber lines.

8. (original) The sensor array of Claim 4, wherein said input couplers and said output couplers are 1×2 couplers.

9. (previously amended) The $m \times n$ sensor array as defined in Claim 1, wherein the coupling ratio of any one of said output couplers is based on a number of said output couplers located between the any one of said output couplers and a signal destination on one of the said n return fiber lines that corresponds to the any one of said output couplers.

10. (previously amended) The $m \times n$ sensor array as defined in Claim 1, wherein the coupling ratio of any one of said input couplers is based on a number of said input couplers located between the any one of said input couplers and a signal source on one of the said m distribution fiber lines that corresponds to the any one of said input couplers.

11. (original) The m ~~H~~× n sensor array as defined in Claim 1, ~~wherein n is 16, and~~ wherein the coupling ratios of said input couplers in said sensor groups include coupling ratios of 3.5%, 7%, 11%, 15%, 20%, 30% and 47%.

12. (original) The m ~~H~~× n sensor array as defined in Claim 1, ~~wherein m is 6, and~~ wherein the coupling ratios of said output couplers connected to one of said return fiber lines include coupling ratios of 15%, 20%, 25%, 30% and 47%.

13. (previously amended) The array of claim 1, wherein the coupling ratios of said input couplers and said output couplers in said z sensor groups serve to cause all the returned optical signal power levels to be within a preselected variance range.

14. (previously added) The array of claim 1, wherein y is greater than or equal to m.

15. (previously added) The array of claim 1, wherein a multiplicative product of m and n is equal to a multiplicative product of z and y.

16. (previously added) The array of claim 1, wherein one or more distribution fiber lines of the m distribution fiber lines are each coupled with two or more corresponding non-adjacent instances of the sensors.

17. (previously amended) The array of claim 1, wherein z is 16 and y is 6.

18. (previously amended) The array of claim 1, wherein z is 8 and y is 12.

19. (previously added) The array of claim 9, wherein the coupling ratio of the any one of said output couplers varies directly with the number of said output couplers located between the any one of said output couplers and the signal destination that corresponds to the any one of said output couplers.

20. (previously added) The array of claim 4, wherein the coupling ratios of said input couplers and the coupling ratios of said output couplers in said sensor array serve to cause all the returned optical signal power levels to be within a pre-selected variance range.

21. (currently amended) An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, wherein each of said input couplers within any of said z sensor groups is connected to a corresponding one of said m distribution fiber lines, wherein each of said output couplers within any of said z sensor groups is connected to a corresponding one of said n return fiber lines;

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in ~~the~~ returned optical signal power levels, wherein said input couplers comprise a first input coupler and a second input coupler, wherein a first number of said input couplers are located between a signal source and said first input coupler on one of said m distribution fiber lines, wherein the first number is greater than or equal to zero, wherein a second number of said input couplers are located between the signal source and said second input coupler on the one of said m distribution lines, wherein the second number is greater than the first number, wherein the input coupling ratio of said second input coupler is higher than the input coupling ratio of said first input coupler;

wherein m is 6 and n is 16.

22. (currently amended) An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, each of said input couplers within any one of said z sensor groups being connected to a different one of said m distribution fiber lines;

wherein the n return fiber lines comprise one or more sets of return fiber lines, wherein a first one of each of the one or more sets of return fiber lines is connected to a first subset of said output couplers within a respective one of said z sensor groups, wherein a second one of each of the one or more sets of return fiber lines is connected to a second subset of said output couplers within the respective one of said z sensor groups;

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in ~~the~~ returned optical signal power levels;

wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler;

wherein m is 6 and n is 16.

23. (previously amended) The array of claim 22, wherein the one or more sets of return fiber lines comprise one or more pairs of return fiber lines, wherein a first return fiber line of each of the one or more pairs of return fiber lines is connected to the first subset of said output couplers within the respective one of said z sensor groups, wherein a second return fiber line of each of the one or more pairs of return fiber lines is connected to the second subset of said output couplers within the respective one of said z sensor groups.

24. (previously added) The array of claim 22, wherein one or more return fiber lines of said n return fiber lines are each coupled with two or more corresponding non-adjacent instances of the y sensors.

25. (previously added) The array of claim 1, wherein each of said input couplers within any one of said z sensor groups is connected to a respective one of said m distribution fiber lines.

26. (previously added) The array of claim 1, wherein each of said return fiber lines is connected to all output couplers within a respective one of said z sensor groups.

27. (previously added) The array of claim 21, wherein z is 16 and y is 6.

28. (previously added) The array of claim 21, wherein z is 8 and y is 12.

29. (previously added) The array of claim 22, wherein z is 16 and y is 6.

30. (previously added) The array of claim 22, wherein z is 8 and y is 12.